

CHAPTER 4

BUILDING ROADS IN ARIZONA, 1846-1956

This historic overview was prepared to facilitate evaluations of the eligibility of roads in Arizona for inclusion in the National Register. With that goal in mind, this chapter discusses the history of road building in Arizona, from wagon roads to state highways, in four parts—each focusing on one of the four criteria of significance established by the National Register.

The first part of this chapter, *Arteries of Travel, 1846-1956*, addresses events and patterns of development of Arizona's automobile roads that are relevant for determinations of National Register eligibility under Criterion A. Certainly, the discussion is not exhaustive and other important themes may be applicable for evaluation of specific roads.

The second section, *Policies and Politics: People Behind Arizona's Road System, 1909-1956*, presents short biographies of several individuals who have been instrumental in Arizona road policy. Associations with these individuals important in the development of Arizona's road system may make some roads eligible for the National Register under Criterion B. Again, the discussion is not intended to be exhaustive and other individuals certainly could be identified by research into specific roads.

The third section, *Outstanding Road Engineering and Construction, 1909-1956*, describes several examples of Arizona roads important for engineering and design. The evolution of road construction techniques also is discussed and provides information that may lead to a determination of National Register eligibility under Criterion C.

The fourth section *What's Left? The Archaeology of Arizona Roads*, describes types of historical archaeological sites that may be associated with historic roads in Arizona. This discussion focuses on evaluating the information potential of historic Arizona roads that may be eligible for the National Register under Criterion D.

ARTERIES OF TRAVEL, 1846-1956

National Register Criterion A states that a historic property may have significance if it is associated with events that have made a significant contribution to the broad patterns of our history. A major stimulus for road building in Arizona has been the passage of federal laws that provided funding for construction of roads. The intersection of federal dollars and Arizona roads is used to organize this historical overview.

During the centuries of occupation by American Indians, Spanish, and Mexicans, travelers followed footpaths and horse trails from water source to water source across the arid lands of Arizona. American Indians, as well as newcomers such as missionaries, conquistadors, mountain men, prospectors, and cavalymen, traveled on routes and trails marked on the land only by years of usage. Although some of their routes eventually became highways due to their favorable terrain, vegetation was not cleared and rocks were not hauled to make these trails more permanent roads. One road historian described these paths and trails as “All wild trail—not an honest-to-goodness road in the lot” (Smith 1941:27).

The construction of roads in nineteenth-century Arizona depended on, and contributed to, migrations across and into the Territory. In order to move men and materials to California to fight the Mexican War in 1846, United States soldiers built the first constructed road in Arizona, a road that generally followed the pathway of the Gila Trail on an east-west path across southern Arizona. Thousands of gold seekers migrated to California on the new road after 1849, and the resulting California population boom clamored

for mail, stage, and railroad services, a clamor that expanded the number of routes across Arizona. The discovery of gold in Arizona in 1863 reversed the westward migration and brought California miners into Arizona to search throughout the Territory for metallic riches. The prospecting newcomers clashed with the Native American residents, and American soldiers were dispatched to settle the disputes, building wagon roads to connect the new military forts. In addition, Mormon migration into Arizona agricultural colonies established new routes into the Territory on north-south corridors. Although development of these wagon roads has been characterized as road building, most segments of these roads continued to be little more than marked trails.

Today, we consider roads as being universally available to both automobile and truck traffic, accommodating small automobiles as well as 18-wheelers. When considering nineteenth-century wagon roads, we must understand the distinction between stagecoach routes and wagon roads. The existence of a dotted line on a map labeled “road” may indicate no more than a marked route accommodating travelers on horseback, or stagecoaches carrying passengers, mail, and light freight. Some of these roads passed over grades too steep for the “18-wheelers of the nineteenth century,” that is, the heavy freight wagons pulled by as many as a dozen or more horses, mules, or oxen. As an example, when the property of the Territorial government had to be moved from Prescott to the new capital at Phoenix in 1889, the furniture, records, and supplies were sent to Phoenix via the railroad because the Black Canyon stage road to Phoenix was impassable for freight. Despite the vestigial glamour of stagecoaches, every segment of the Arizona Territory depended on freight wagons and wagon roads to deliver goods and food. The Goldwaters, Haydens, Ochoas, and other famous families in Arizona history began their businesses by freighting goods along Territorial wagon roads.

Another important point to keep in mind when considering Territorial roads is the dominance of the other type of road throughout Arizona—the railroad. Railroads hauled ores from Arizona’s mines, shipped the produce from Arizona’s agricultural fields, brought in building supplies, and delivered tourists and new residents. As in the rest of the country, roads often were built only to connect the traveler with the closest railroad depot, or in the case of western Arizona, with river landings along the lower Colorado River.

Dirt Tracks: Arizona Wagon Roads, 1846-1909

Beginning with the first wagon road built in Arizona and continuing until the appointment of the Territorial Engineer, the period from 1846 to 1909 encompassed numerous road builders with a myriad of agendas. During the period, no territorial department oversaw road construction in Arizona, which was administered primarily by the counties. However, the military, the Mormons, private toll road companies, and the territorial government itself also built some roads in Arizona. All these roads were built for wagon traffic, not automobiles; all were dirt, graded, or graveled roads at best, and probably little more than marked trails when crossing level terrain. Many did not connect with other roads to form through routes.

The Army built three important wagon trails across Arizona—Cooke’s Wagon Road, Beale Wagon Road, and Crook Trail. The first road built across Arizona, Cooke’s Wagon Road, was constructed for the passage of troops and became one of the most important immigrant routes in the West. During the Mexican War, Kearny’s Army of the West traveled from St. Louis to California through the Arizona Territory along the well-known Gila Trail adjacent to the Gila River from the New Mexico border to Yuma, and produced the first map of the famous horse trail. A few months later, Captain Philip St. George Cooke led the Mormon Battalion along Kearny’s path in 1846-1847, constructing a wagon road to accommodate their supply wagons. Soon known as Cooke’s Wagon Road, the new road diverted from Kearney’s mountainous path along the upper Gila River in eastern Arizona and headed south to find gentler terrain for wagons. The battalion built their road north from the Arizona-Mexico border along the San Pedro River, west to the Santa Cruz River and the settlement of Tucson, north along the Santa Cruz to

the Pima Villages on the Gila River, then west along the Gila River to the Colorado River (Figure 8). Before the paperwork ending the Mexican War had been signed, miners discovered the first gold in California, and the military wagon road constructed by the Mormon Battalion became an immigrant trail for “Forty-niners” headed for the goldfields. In the twentieth century, the east-west Territorial Highway, portions of the Ocean-to-Ocean Highway, U.S. Highways 80 and 84, and Interstates 8 and 10 all followed the general path of Cooke’s Wagon Road.

The second important Arizona road built by the military is the Beale Wagon Road. Only a few years after the construction of Cooke’s Wagon Road, Lt. A. W. Whipple surveyed northern Arizona in 1853 to locate a route for a transcontinental railroad. In the winter of 1857-1858, Lt. Edward Fitzgerald Beale again surveyed the Territory from east to west along the 35th parallel, this time in anticipation of building a wagon road from Fort Smith, Arkansas to the Colorado River, a distance of more than 1,000 miles. Lt. Beale returned in 1859 with a crew of men and 22 camels to carry road construction supplies and tools, and completed a 10-foot-wide simple wagon road by removing rocks and vegetation from the roadbed to the edge of the new road (refer to Figure 8). Beale’s Wagon Road also served as an important immigrant trail across northern Arizona until the completion of the railroad along the same route in 1883. During the twentieth century, the National Old Trails Highway, National Park to Park Highway, and later, U.S. Highway 66 and Interstate 40 all followed the general path of Beale’s Wagon Road.

A third important Arizona military road was one of many wagon roads that connected the more than a dozen military forts in Arizona after the Civil War (refer to Figure 8). In the early 1870s, an Army officer sent to the Territory to deal with Indians also became a leader in improving the daily lives of his Arizona soldiers. General George W. Crook, lauded as “Brave, Generous, and True” upon his departure from Arizona in 1875, “broke up military camps which had been hotbeds of fever and pestilence and constructed first class wagon roads to connect all the Arizona posts” (Wagoner 1970:141-142). One of the wagon roads hacked through the forests of central Arizona under Crook’s direction became known as “Crook’s Trail.”¹ We can thank an articulate officer’s wife, Martha Summerhayes, for a description of her journey in the first group of military wagons and ambulances to use the new wagon road (which appears to have been mostly a simple trail rather than a built road).

The traveling was very difficult and rough, and both men and animals were worn out by night. . . The roads had now become so difficult that our wagon-train could not move as fast as the lighter vehicles or the troops. Sometimes at a critical place in the road, where the ascent was not only dangerous, but doubtful, or there was, perhaps, a sharp turn, the ambulances waited to see the wagons safely over the pass . . . It did not surprise us to learn that ours was the first wagon-train to pass over Crook’s Trail. For miles and miles the so-called road was nothing but a clearing, and we were pitched and jerked from side of side of the ambulance, as we struck large rocks or tree-stumps; in some steep places, logs were chained to the rear of the ambulance, to keep it from pitching forward onto the backs of the mules. At such places, I got out and picked my way down the rocky declivity (Summerhayes 1979:66-69).

Roads connected all the nineteenth-century forts in Arizona, but only a few became as important to non-military traffic as those built by Cooke, Beale, and Crook. For example, military use of the Reno Road from Camp McDowell to Camp Reno lasted only two years from 1868, when Camp Reno was established, to 1870, when it was abandoned. However, miners, settlers, and stagecoaches used the road as the only route between Globe and Phoenix to communities such as Payson until the Roosevelt-Mesa Road (Apache Trail) was completed in 1904.

¹ Cook’s predecessor, General George Stoneman, initiated construction of Crook’s Trail, Reno Road, and Stoneman Grade, but his command of the Department of Arizona was short (1870-1871) because Arizonans thought he was too soft on the “Indian issue” (Wagoner 1979:124-126).

Mail service on horseback followed earlier trails and added new routes as new mining and agricultural settlements appeared in the Territory. Stage lines operated between mining boomtowns and supply points (refer to Figure 8). All nineteenth-century Arizona roads were susceptible to highwaymen. In a letter to the House of Representatives in 1871, Territorial Governor A.P.K. Safford expressed concern over the raids on highway travelers and station keepers by Mexican and Apache bands. “Dangerous and insecure as is nearly every highway in the Territory on account of the Apache Indians, I consider none more so than the Gila road . . . [which was] infested with Mexican robbers” (Wagoner 1970:105).²

Moving south to settle the agricultural lands of Arizona, Utah pioneers followed north-south roads, most often using Lee’s Ferry to cross the Colorado River. The most famous of the Mormon roads became known as the Honeymoon Trail, because couples traveled from settlements in Arizona to be married in the temple in Salt Lake City (refer to Figure 8). Arizona historian Will C. Barnes once accompanied a wagon train on the Honeymoon Trail and described the efforts expended to cross a rain-swollen wash.

Where hill and mountains were in its way, [the trail] simply either went up and over them, or else dodged them by going miles around. When washes were running belly deep to a horse and as swift as a horse could run, the wagons went into camp and waited, sometimes days, for the water to stop running. Often, when it did stop, there were two or three feet of soft, sticky mud which necessitated hitching three or four teams of horses, aided by long ropes pulled by the men and women, to get the heavily loaded wagons through and across (Cook 1989:66).

The Arizona Territory was separated from New Mexico in 1863 and the first Territorial Assembly, meeting in 1864, followed the lead of the federal government in authorizing private companies to build toll roads. Similar to the system that had built turnpikes in the eastern states in the early nineteenth century, the toll road system in the Arizona Territory allowed roadwork to take place without financial support from the Territory. In fact, the Territory charged a 2 percent tax from private toll road companies, and the proceeds went into the general school fund. In addition to allowing the construction of toll roads in Arizona, the First Territorial Assembly recognized several existing roads as free routes.

Acts of incorporation for the toll road companies required the roads to be completed within a specified period of time, and for the roads to be maintained and passable. The only required roadside amenities were water wells and watering facilities for people and horses. In that first legislative session, six toll road companies received franchises from the Territorial Legislature, and not surprisingly, most of the authorized roads traveled to and from Prescott, the Territorial capital (Table 3).

Two years later in 1866, in order to shift the burden of road building to the county level, the Territorial government empowered Arizona county boards of supervisors to establish road districts, issue road bonds, and levy property taxes to pay for road construction. The counties also were empowered to tax each able-bodied man in the county 6 dollars, or two days of roadwork, each year (Arizona State Highway Department 1939:3-4). In 1871, the Territorial Legislature also shifted the responsibility of incorporating toll road companies to the counties (Arizona State Highway Department 1939:2-4).

In 1877, the ninth session of the Territorial Legislature authorized Maricopa County to issue \$15,000 in bonds to finance the construction of four wagon roads. Two of these roads were planned to connect Phoenix to Prescott, one by way of Wickenburg and the second by way of the Black Canyon. The third road connected Phoenix to Globe, and the fourth connected Phoenix to Yuma.

²Despite the governor’s rhetoric, one can assume that not all robbers were Mexicans or American Indians, for in 1877, the Territorial Legislature authorized the governor to reward the captors of two highwaymen with Anglo names—M.V. Alexander and Thomas Berry, who had robbed the stage in Skull Valley (Wagoner 1970:113).

TABLE 3
TOLL ROAD COMPANIES AUTHORIZED BY
THE FIRST ARIZONA TERRITORIAL LEGISLATURE, 1864

Toll Road Company	Roads
Santa Maria Wagon Road Company	Prescott to the Colorado River
Tucson, Poso Verde and Libertad Road Company	three roads from Tucson to mines in southern Arizona
Arizona-Central Road Company	Prescott to La Paz (on the Colorado River)
Mohave and Prescott Toll Road Company	Prescott to Mohave (on the Colorado River)
Prescott, Walnut Grove, and Pima Road Company (King Woolsey, Jack Swilling, and others)	first north-south highway to Prescott
Prescott and Fort Wingate Road Company	Prescott to Fort Wingate, New Mexico
Source: Wagoner 1970:54-55	

In his address to the legislature in 1879, new Governor John C. Fremont requested the authorization of “half a million dollars for the construction of good roads,” as he understood “that the development of potential resources depended upon the improvement of transportation” (Wagoner 1970:169). The participants of the Tenth Legislature did not share Fremont’s sweeping vision for roads or were more realistic about funding limitations and refused to consider his request. Editorial writers of the *Tucson Citizen* suggested that Fremont might have received a better response if he had selected specific road projects to fund rather than speaking in such general, and expensive, terms (Wagoner 1970:171).

In fact, the Territorial Legislature authorized money for road construction on only a few occasions. Between 1877 and 1881, the Legislature issued a total of \$70,000 in road construction bonds. Tucked in among the almost \$300,000 appropriated by the 1885 “Thieving Thirteenth” Territorial Legislature were \$15,000 for a bridge across the Gila River and \$12,000 for an “Apache wagon road.” Territorial Governor Zulick complained that the road and bridge expenses should be county responsibilities, not territorial government expenses, and that the huge budget resulted from “wanton misappropriation of public funds” (Wagoner 1970:239). In response, Congress passed the Harrison Act to restrict indebtedness by all Territories, and the next Arizona legislature restricted its financial obligations to less than \$50,000, with no provision for roads, and earned the moniker, the “Measly Fourteenth.” The Gila River bridge at Florence required repairs 20 years later, and in 1905, the Territorial Legislature issued a \$19,000 bond to fix the structure (Arizona State Highway Department 1939:4).

Across the United States before about 1910, more than 95 percent of rural roads were under county jurisdiction.³ County responsibility for road building had led to disparate and mismatched road construction, and the roads built by one county sometimes did not connect to the roads built by adjacent counties—a pattern that occurred all across the United States. In 1913, the young Congressman Carl Hayden expressed the frustration of the American public in his defense of the highway bill he introduced that year, one of the many unsuccessful road finance bills introduced before the passage of the 1916 Federal Aid Road Act. Representative Hayden opened his remarks stating,

The advocates of national highways . . . insist that a system of roads should be built that will be the main arteries of interstate travel connecting the State capitols and larger centers of population. They believe in roads that begin somewhere and end somewhere (U.S. Congress 1913:2).

To help address this problem, the Territorial Assembly voted in 1909 to create the office of Territorial Engineer, and Governor Richard E. Sloan appointed J. B. Girand as the first, and only, Territorial Engineer. The Territorial Highway Department consisted of Girand, a clerk, and a draftsman. The

³ Today, about 55 percent of the 3 million miles of rural roads in the country are under county jurisdiction (FHWA 2002).

Assembly also established a small Territorial Road Fund, to be used “where the greatest immediate benefit may be secured” (Rodda 1992:4). In 1909, the Territory and counties together spent a total of only about \$20,000 on roads, a dollar figure that would increase significantly over the next decade.

Gravel Highways: Early Automobile Roads in Arizona, 1909-1927

Beginning with the appointment of the Territorial Engineer and ending with the establishment of the Arizona State Highway Department, the period from 1909 to 1927 represented a significant period of road development and consolidation in Arizona. Although county governments continued to be responsible for roads in their jurisdictions, the Territorial Engineer assumed the responsibility of creating roads to connect counties and county seats across the state. This work to create connected, long-distance routes was also taken up by highway booster associations as they promoted cross-country routes through the state. The work continued with the 1921 Federal Highway Act, which required federally funded roads in Arizona to be connected with federally funded roads in neighboring states. In addition to route consolidation, the new Territorial Engineer faced the task of improving roads that had been built for wagons, not automobiles, and were often little more than two-track dirt trails through the forests and deserts (Figures 9 and 10). There was much roadwork to be done across the Territory.



Figure 9: Early Two-Track Trail Through the Pines near Flagstaff, circa 1910



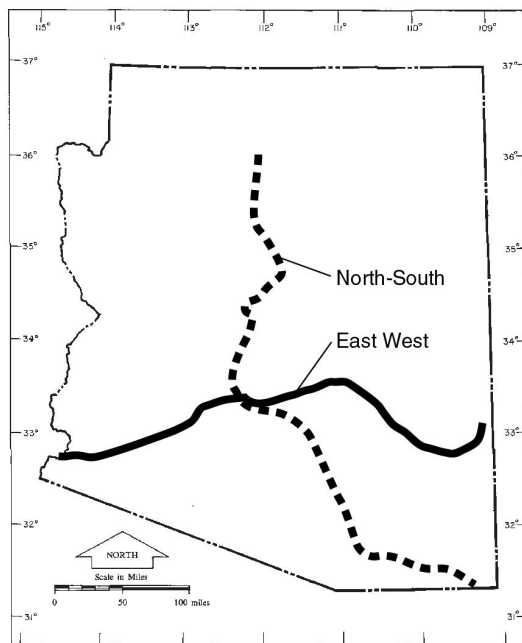
Figure 10: Early Two-Track Trail Through the Desert, circa 1910

In shifting the discussion from nineteenth-century wagon roads to twentieth-century automobile roads, it must be noted that for many years and many miles in the early 1900s, Arizona automobiles traveled along two-track dirt trails, graded dirt roads, and graveled roads. Concrete and asphalt roads did not become commonplace until the road improvement projects of the 1930s. In addition, the dominance of rail transportation continued into the 1950s. For example, families in Morenci in the 1920s visited doctors and bought goods in El Paso, Texas because it was more convenient to travel to El Paso via the Southern Pacific Railroad than to drive to Phoenix or Tucson via highways, and many did not own cars.

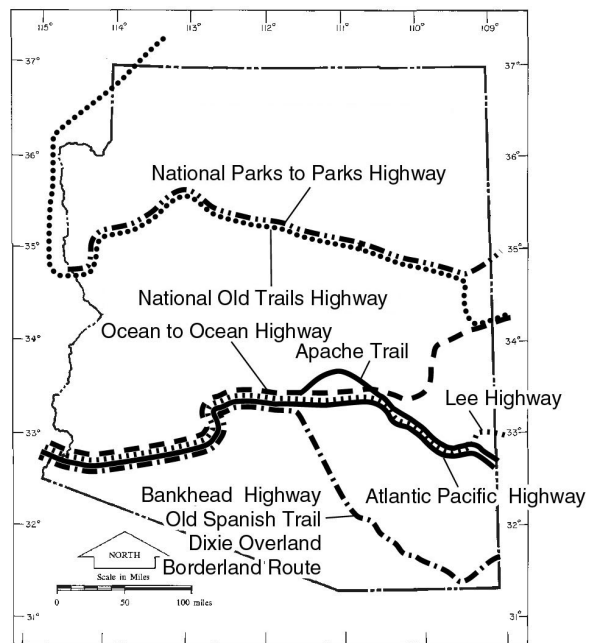
Public Funds

In the 1910 census, Arizona ranked forty-sixth in both population and mileage of public roads (Arizona Good Roads Association 1914:8). Territorial Engineer J. B. Girand envisioned an inter-connected system of Arizona highways as one of his first goals after his appointment in 1909. He drew up a plan to transform existing wagon roads, county roads, and trails into two great highways connecting 10 of the 14 Arizona county seats with about 1,000 miles of road. The proposed east-west Territorial Highway connected Yuma to Clifton via Phoenix, Globe and Solomonsville (county seat of Graham County at the time), and the proposed north-south road connected Douglas to the Grand Canyon via Tombstone, Tucson, Florence, Phoenix, Prescott, and Flagstaff (Figure 11; refer to Pocket Map 1).

By the time of statehood three years later, Girand had personally supervised the improvement of 243 miles of highway, and anticipated the improvement of an additional 740 miles (Table 4) (Fraserdesign 1987:4-5). Road construction sometimes employed convicts, especially on larger jobs, a practice that continued from 1909 when Girand used prison labor to build a replacement bridge over the Gila River at Florence until the 1933 Federal Aid Act prohibited the use of convict labor on federal-aid roads.

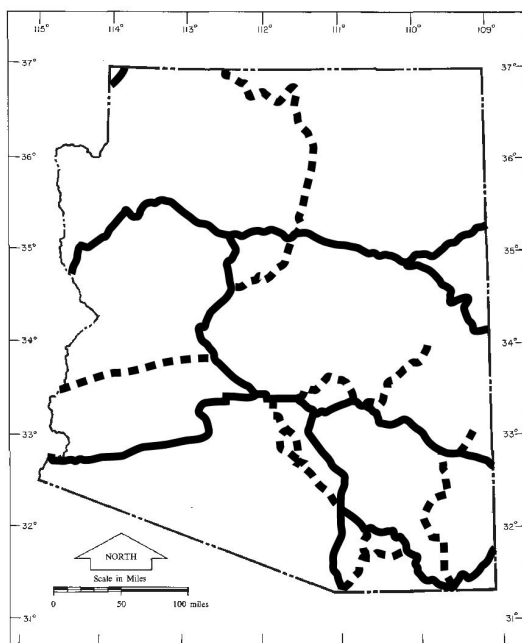


Proposed Territorial Highways, 1909

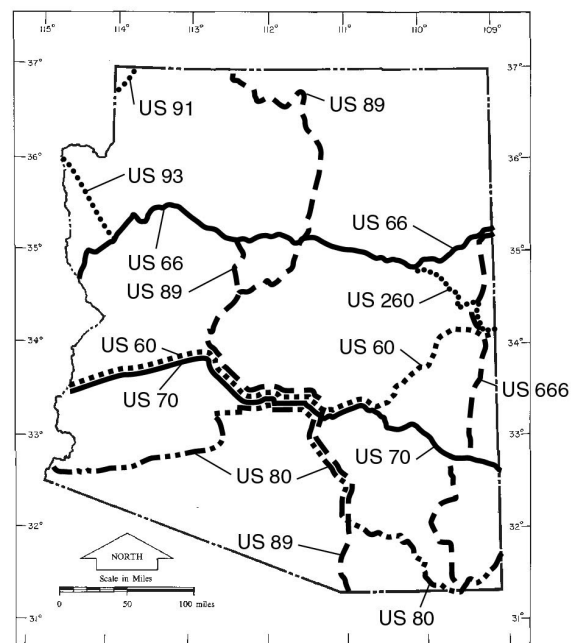


Private Highways, c. 1925

(see pocket maps for detail)



— Federal "Seven Percent System" and
 - - - State Highways, 1927



U.S. Highways, 1939

Figure 11: Major Arizona Highways

TABLE 4	
MILEAGE OF STATE HIGHWAYS IN ARIZONA, 1921-1995	
Year	Mileage of Constructed Highways
1912	243 miles (740 additional miles projected)
1921	1,498 miles designated as “seven percent system”
1927	1,968 miles
1929	2,134 miles
1939	3,623 miles
1995	about 6,000 (1,100 miles = interstate highways)
Sources: Arizona State Highway Department 1939:15; Fraserdesign 1987”4-5; Gray 1995b, 1995c;	

In 1911, the “self-educated, unpolished” George W.P. Hunt successfully sought the office of governor of the new state, and knew enough about Arizona politics to include a call for better roads in his platform (Wagoner 1970:483-484). After statehood in February 1912, Hunt appointed Lamar Cobb as State Highway Engineer, replacing Territorial Engineer J. B. Girand. Unlike Girand, Cobb did not personally oversee road construction and depended instead on contractors to perform the work. Although most of Cobb’s budget paid for horseshoes, hack rental, harness repairing, and veterinary medicine, the department bought its first motor vehicle in 1914, a Ford automobile.

Also in 1912, the State Legislature passed the first state road law, which directed the new State Highway Engineer to designate 1,500 miles of roads and highways as a system of state highways. The new system was planned to supplement the two Territorial highways and connect principal towns across Arizona (Figure 12). Also, the Legislature allocated \$250,000 to the counties for roads (Gray 1995a:4).

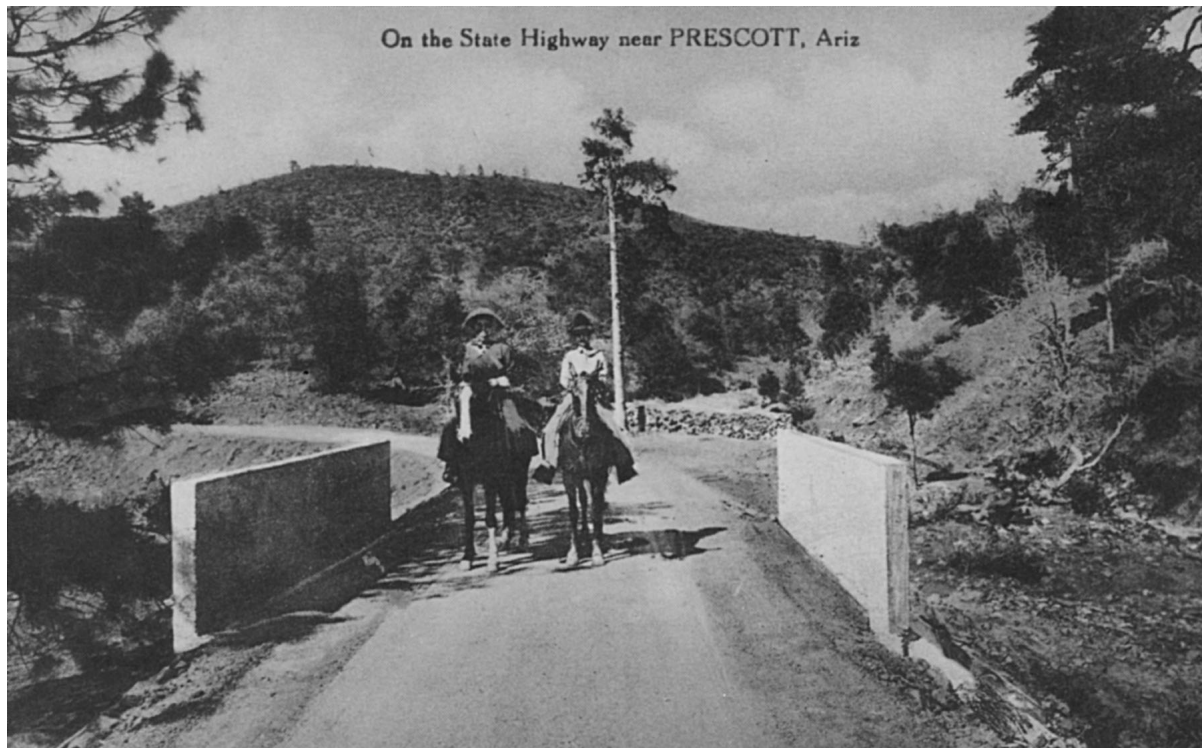


Figure 12: On the State Highway near Prescott, after 1912

After the Arizona State Legislature authorized the State Engineer to enter into cooperative contracts with the federal government and pledged state funds to matching the offered federal dollars in March 1917, the

money authorized by the 1916 Federal Aid Road Act began to flow into Arizona. Almost \$10 million became available for road construction projects over the ensuing 10 years (State Highway Engineer 1926:31). The State Engineer chose a \$56,000 repair to the vital Gila River Bridge near Florence as “Federal Aid Project No. 1,” and most of the 90 projects undertaken with federal money between 1916 and 1926 cost less than \$100,000. Nineteen topped the \$100,000 mark, and the nine most expensive projects (all more than \$150,000) are listed in Table 5.

TABLE 5		
LARGEST FEDERAL AID PROJECTS IN ARIZONA, 1916-1926		
Federal Aid No.	Name of Project	Federal-Aid Received
46	Phoenix-Yuma	\$502,230
16	Superior-Miami	\$422,349
59	Phoenix-Wickenburg	\$210,169
62	Prescott-Ash Fork	\$186,302
71	Phoenix-Yuma	\$185,424
55	Yuma-Phoenix	\$180,144
72-B	Prescott-Phoenix	\$180,006
18	Benson-Vail	\$156,712
48	Glendale-Marinette	\$150,263
Source: State Highway Engineer 1926:30-31		

By 1920, with the infusion of federal money from the 1916 Federal Aid Road Act, the Arizona Highway Department “employed more personnel than all other state agencies combined” (Fraserdesign 1987:15). The department hired more engineers than any other employer in the state, maintained the state’s largest fleet of trucks, and purchased more explosives than any other entity in the state.

Booster Highways

At about the same time Arizona became a state, booster highway associations worked across the nation to promote connected cross-country routes. By the early 1920s, booster organizations named and promoted 10 of these highways across Arizona, often incorporating the same roads (refer to Figure 11). Four highways—Borderland Route, Dixie Overland Highway, Old Spanish Trail, and Bankhead Highway⁴—used the east-west Territorial highway across southern Arizona from Yuma to Phoenix, and the north-south Territorial Highway from Phoenix to Douglas. The Lee Highway and Atlantic Pacific Highway followed the east-west Territorial Highway from Yuma to Safford; east of Safford, the Lee Highway headed north to Clifton and the Atlantic Pacific went southeast to Duncan (east of Globe, a second segment of the Atlantic Pacific Highway branched north to Springerville). The Ocean-to-Ocean Highway followed the Territorial Highway from Yuma to Globe, and then joined the branch of the Atlantic Pacific heading north to Springerville (Figure 13). The Apache Trail ran from Lordsburg, New Mexico to Phoenix, following the east-west Territorial Highway west of Solomonsville (Figure 14). The National Old Trails Highway and National Park to Park Highway extended from Topock, Arizona on the Colorado River across the state eastward to St. Johns. At St. Johns, the Park to Park Highway turned north to Zuni, New Mexico, while the Old Trails Highway branched south to Springerville (refer to Pocket Map 2).

⁴ Alabama Representative John H. Bankhead father of actress Tallulah Bankhead (1903-1968), actively supported Congressional funding for highway construction and sponsored the 1916 Federal Aid Road Act.



Figure 13. Ocean-to-Ocean Highway, circa 1912



Figure 14. On the Apache Trail below Roosevelt Dam

In July 1914, the Arizona Good Roads Association called a statewide meeting at the Yavapai County Courthouse in Prescott to discuss the possibility of a state bond issue to finance road construction. Although the state bond issue never came to fruition, the invitation to the meeting reveals the wide interest in good roads. The list of officers of the Arizona Good Roads Association included many prominent Arizona names, including the State Highway Engineer Lamar Cobb, Dwight B. Heard and Lin B. Orme of Phoenix, Gustav Becker of Springerville, T.A. Riordan of Flagstaff, and Harold Steinfeld and Hiram Corbett of Tucson. The meeting invitation list included county boards of supervisors, county road superintendents, directors of the Arizona Good Roads Association, and representatives from Arizona cities and towns. The day following the meeting, the Arizona Automobile Association held its first official meeting, and no doubt many of the same people attended that gathering.

It is interesting to note that the decision makers of the Arizona Good Roads Association scheduled this serious meeting of Arizona highway boosters to coincide with the opening day of the Frontier Days rodeo in Prescott. Also as part of the festivities, the Prescott Auto Club sponsored an auto race around the "Prescott New Outer Loop," a road from Prescott to Chino Valley maintained by the club for automobile races. The drivers raced around the loop twice for a total of 88 miles, and the first place finisher received a winning purse of \$1,000 (Arizona Good Roads Association 1914:4).

The Seven Percent System in Arizona

As described above, the Federal Highway Act of 1921 had two significant provisions. First, federal dollars would be allocated to match state dollars to construct or improve 7 percent of the highways in each state, with the requirement that these federally funded roads connect at state boundaries with other federally funded roads. Second, in recognition of the greater distances and greater acreage of federal lands in the western states, the act allowed for a sliding scale for the state matching funds requirement. The Act

did not increase the allocation of Federal money [for Western states], but it did diminish markedly the required State-matching money. It decreased it by adding to the fundamental 50 percent contribution by the Federal government an amount equal to one-half the percentage of the State's area held by the Federal Government in public land, Indian reservations, etc. The percentage of Federal Aid paid in Arizona thus is 71.06 percent [as opposed to 50 percent] (Hewes 1946:46).

Arizona proposed a total of 1,498 miles of roads to be included in the 7 percent system, a network reminiscent of both the Territorial Highway system and the highways named and promoted by booster organizations (refer to Figure 11). The Yuma-Phoenix-Tucson-Douglas-New Mexico highway followed a route common to several booster highways as well as both Territorial Highways, and subsequently was designated U.S. Highway 80 (Figure 15). The Florence Junction-Globe-Safford-Duncan highway followed the route of the Lee Highway, the Atlantic Pacific Highway, and the portion of the old Territorial Highway route from Globe to Solomonsville. The northernmost route followed the National Old Trails Highway from the Colorado River to the New Mexico border east of Springerville, and added a new section heading northeast from Holbrook to Gallup, New Mexico (the route of U.S. Highway 66). The Tucson-Nogales Highway was a new route, as was the Phoenix-Wickenburg-Prescott-Ash Fork Highway, although all these "new" highways improved existing county roads.

Approximately 1,100 miles of the 7 percent system had been improved by December 1926 (890 miles with federal funds and the remainder with state and county funds). Just less than 800 miles of the highway system had been graveled, and 100 miles had been graded and drained. Less than 20 percent of the federally funded system had been hard paved (130 miles of concrete pavement and 70 miles of asphalt) (State Highway Engineer 1926). Paving would occur over the next 15 years.

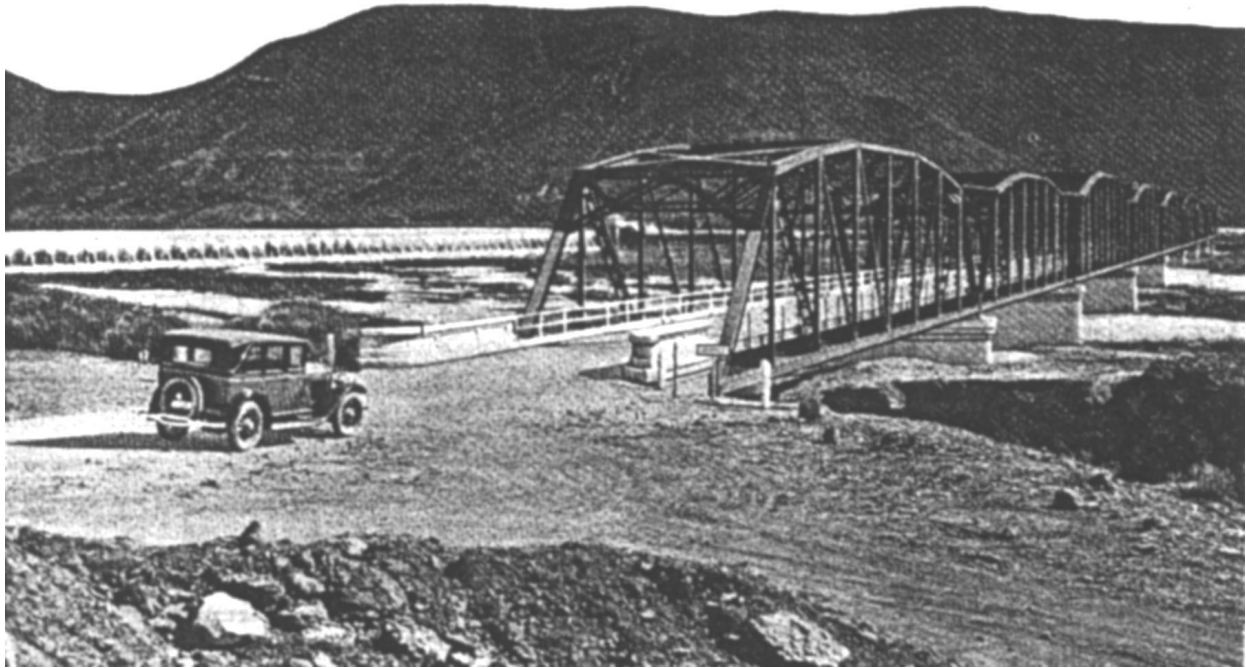


Figure 15. Gila River Bridge on U.S. Highway 80, circa 1927

The 1920s ushered in other events not directly related to road construction but of interest to automobile history. In 1920, the State Engineer appointed the first maintenance engineer to oversee road maintenance (Arizona State Highway Department 1939:23). In 1921, Arizona passed its first law taxing gasoline, at the rate of 1 cent per gallon, and the monies were earmarked for highway construction. The legislature raised the gas tax to 4 cents a gallon in 1927 (Arizona State Highway Department 1939:29-30). In 1925, the state of Arizona issued driving licenses for the first time. Applicants simply mailed in a form, passed no tests, and women did not have to state their exact ages (“over 18” sufficed). The state did not require driving tests before granting a license until 1935 (Rodda 1992:17). In 1926, Arizona produced the first in an annually updated series of state road maps, published by the Arizona State Highway Department.

Federal dollars from the 1916 Act had prompted a flurry of road-building projects across the state, but a 1923 investigation into the work of the State Engineer revealed that some of the federal road money had been used on projects other than road construction (Housley 1996:30). The misdirection of federal highway funds was not unique to Arizona, as many states were unequipped to control the flow of new money.

The 1927 state law that abolished the office of State Engineer and established both the Arizona State Highway Department and Arizona State Highway Commission also set up the Department of Motor Vehicles. This law “was the first systematic highway code for the administration of all matters and affairs directly affecting the highways of the State,” and opened a new era for highways in Arizona (Arizona State Highway Department 1939:4).

Asphalt and Concrete: Arizona's Highway System, 1927-1956

Although the 30 years from 1927 to 1956 encompassed several significant eras in American and Arizona history, the period was a simpler one for Arizona's roads. The paving of roads in the state was the primary theme of the period, which began with the establishment of the Arizona State Highway Department in 1927 and ended with the passage of federal legislation funding an interstate highway system in 1956. Federal dollars from several sources funded hundreds of road improvement projects during the 1930s, including bridges and overpasses to separate railroad grades after passage of the 1935 Emergency Relief Appropriation Act. World War II brought a temporary halt to highway construction and maintenance, with the exception of roads to access new military installations. Other major construction projects, such as the construction of Hoover Dam, also prompted the construction of access roads. In the late 1940s and during the first half of the 1950s, the Arizona State Highway Department continued the process of paving and improving highways across the state.

Federal Dollars for the State Highway System

One of the first acts of the new Arizona State Highway Department was to approve the selection of routes for the state highway system, which was, in effect, a "rubber stamp" of the work conducted by the Territorial and State Engineers. Less than a month after its creation in August 1927, the new Arizona State Highway Department approved 1,954 miles as a part of the state highway system (Table 6). All of the roads that had been paved with concrete or asphalt were part of the federal "7 percent" system. All state routes in 1927, a total of almost 900 miles, were graded, graveled, or unimproved (Arizona State Highway Department 1939:20).

TABLE 6		
MILEAGE OF THE STATE HIGHWAY SYSTEM, 1927		
Route¹	Description of Route	Miles
U.S. Highway 66	Topock-Kingman-Ash Fork-Flagstaff-Holbrook-New Mexico state line	385.2
U.S. Highway 70	Florence Junction-Globe-Safford-New Mexico state line	179.2
U.S. Highway 80	Yuma-Phoenix-Florence-Tucson-Benson	499.5
U.S. Highway 60/260	Holbrook-Concho-St. Johns-Springerville-New Mexico state line	107.5
U.S. Highway 89	Ash Fork-Phoenix	165.1
U.S. Highway 89	Tucson-Nogales	64.2
U.S. Highway 91	Utah state line-Littlefield-Nevada state line	17.0
State Route 73	San Carlos-McNary	89.1
State Route 79	Jerome-junction with US 89 northeast of Prescott	25.7
State Route 81	Douglas-Cochise	62.6
State Route 81	Bowie Junction-Safford	34.3
State Route 81	Solomonsville-Clifton	25.8
State Route 82	Nogales-junction US 80	68.2
State Route 83	Sonoita-Mt. View (junction US 80)	27.8
State Route 84	Casa Grande-Tucson	62.8
State Route 87	Chandler-Picacho	47.1
State Route 88	Apache Junction-Globe	78.6
State Route 187	Sacaton-Casa Grande	14.4
Total		1,954.1
¹ U.S. Highway designation indicates roads in the "7 percent system" of the 1921 Federal Highway Act Source: Arizona State Highway Department 1939:15-17		

Nearly \$40 million of federal aid money paid for most of the road improvements in Arizona from 1917 through 1939 (Table 7). In addition to the federal aid from 1917 into 1939, the state gathered road construction dollars from gasoline taxes (\$26 million, after 1921), motor vehicle licensing fees (\$13 million, after 1913), Arizona property taxes (\$5 million, until 1934), and appropriations from the general fund (\$4 million). Although the Territory did issue a few bonds for road construction, and the Arizona Good Roads Association called for the same type of funding from the state, the state of Arizona has always been reluctant to issue bonds to finance road construction (Arizona State Highway Department 1939:33-34).⁵

TABLE 7
FUNDING OF ARIZONA HIGHWAY PROJECTS, 1917-1939

Year	Class of Funds	Federal Funds	State Matching	Total
1917-1933	Federal-aid	\$20,824,848	\$ 9,708,380	\$30,533,228
1934	Public Works	5,211,960	799,915	6,011,875
1935	Public Works	2,635,785	392,910	3,028,695
1936	Works Program Highway	2,569,656	601,903	3,171,559
1936	WPA Grade Crossing	1,232,050	84,658	1,316,708
1936-1939	Federal-aid	5,354,198	2,098,532	7,452,730
1938	Federal-aid Grade Crossing	4,718	- 0 -	4,718
1938-1939	Federal-aid Secondary Roads	251,114	144,791	395,905
	Federal Lands funds ¹	1,363,940	40,429	1,404,369
	Totals	\$39,448,271	\$13,871,518	\$53,319,789

¹ Includes road construction funds from the Forest Service, Bureau of Indian Affairs, and others.

By the end of 1938, the state highway system had grown from approximately 2,000 miles to 3,624 miles (Figures 16 through 20). The more significant statistic is the increase in the use of asphalt to pave Arizona's highways. In 1927, before the introduction of "low-cost mixed bituminous" pavement, only about 80 miles of Arizona state highways had any sort of asphalt paving (Table 8). Portland cement concrete covered 141 miles, while 869 miles of roads were gravel surfaced. Almost half of the highways had only been graded (758 miles) or remained unimproved (142 miles). After a decade of experience with asphalt paving, more than half of the state highways had been paved with mixed bituminous (1,680 miles) or bituminous surface treatment (362 miles) in 1938. Mileage in concrete decreased to 125 miles apparently because some concrete roads were paved over with asphalt. The mileage of gravel roads also declined from a high of 912 miles in 1926 to 518 miles in 1938 as roads were paved. Mileage of graded roads decreased from a high of 1,147 miles in 1929 to 597 miles in 1938. In 1939, slightly more than 200 miles of the state highway system remained unimproved (Arizona State Highway Department 1939).

The 1912 to 1939 system of state highways is detailed in the 1939 report by the Arizona State Highway Department, *History of the Arizona State Highway Department* (Table 9). The designation "U.S." indicates those miles of the state highway system also included in the federal 7 percent system as of 1922. Characteristics of these early state highways include a graded, graveled, or paved surface with a grade of no more than about 6 percent (with exceptions, including State Route 88). In general, paved roads built before 1930 are no more than 18 feet wide, roads built between 1930 and 1937 are no more than 20 feet wide, and roads built after 1937 were at least 22 feet wide (State Engineer 1939:22).

⁵ The State Transportation Board has been authorized to issue bonds for certain purposes but these are not considered a legal debt of the State. In 1984, the State was authorized to issue Grant Application Notes, which are essentially borrowings against future payments of the federal share of projects that have been used to accelerate construction of some projects (ADOT 2002). Local communities participate in paying the interest costs.

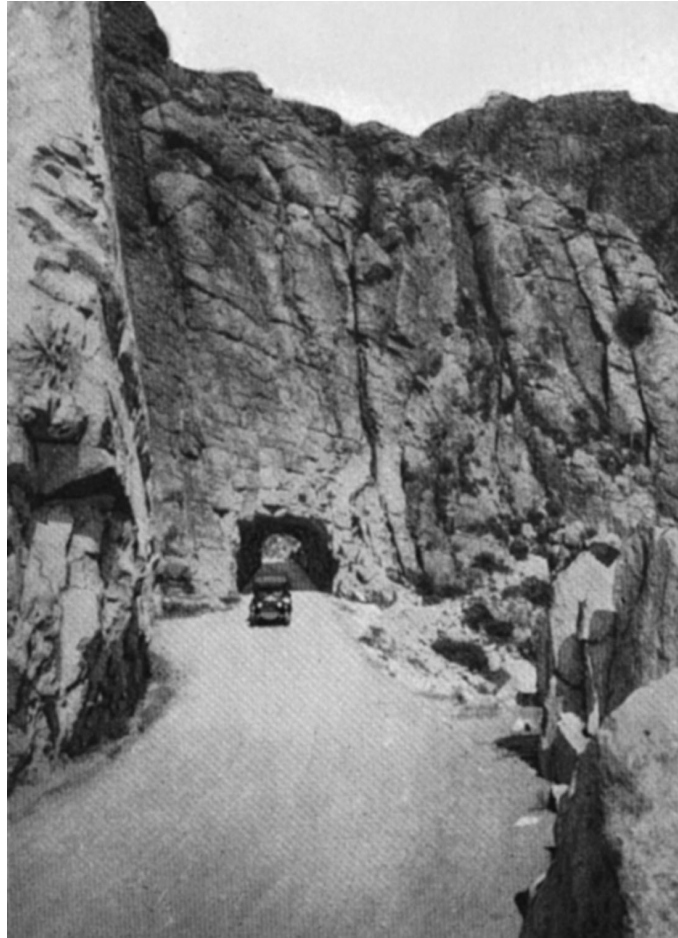


Figure 16. Claypool Tunnel on U.S. Highway 60, circa 1932



Figure 17. U.S. Highway 80 near Yuma, circa 1930s



Figure 18. U.S. Highway 66 at Goldroad, circa 1930s



Figure 19. U.S. Highway 89 near Cameron, 1936



Figure 20. U.S. Highway 60 near Wickenburg, 1939

TABLE 8 DEFINITIONS OF ROAD TYPES	
Road Type	Definition
Unimproved road	A road composed wholly, or with minor local exceptions, of the natural ground of the region traversed, which may or may not have been bladed, which does not conform in respect to alignment, grade and drainage, at least to the definition of a "graded and drained earth road," and on which the only work that has been done by public authority is that required to maintain a condition of bare passability for horse-drawn or motor vehicles.
Graded and drained earth road	A road of natural earth, aligned and graded to permit reasonably convenient use by motor vehicles, and drained by longitudinal and transverse drainage systems, natural or artificial, sufficiently to prevent serious impairment of the road by surface water.
Gravel or stone road	A graded and drained road, the wearing surface of which consists of gravel, broken stone, slag, chert, caliche, iron ore, shale, chat, disintegrated rock or granite, or other similar fragmental material (coarser than sand).
Bituminous surface-treated road	A graded and drained earth road, a soil-surfaced road, or a gravel or stone road, to which has been added by any process a surface mat of bituminous material and mineral aggregate less than 1 inch in compacted thickness.
Mixed bituminous road	A graded and drained road, the wearing surface of which is one inch or more in compacted thickness, composed of gravel, stone, sand or similar material, mixed with bituminous material under partial control as to grading and proportions.
Bituminous penetration road	A graded and drained gravel or stone road, consisting of a base course and a wearing course one inch or more in compacted thickness.
Bituminous concrete or sheet asphalt road	A graded and drained road, the wearing surface of which consists of gravel, stone or sand, mixed with bituminous material in accordance with precise specifications defining gradation of the mineral aggregate and proportions of aggregate and bituminous cement 1 inch or more in compacted thickness, and laid on a base course of either rigid or non-rigid type.
Portland cement concrete road	A graded and drained road, the wearing surface of which consists of Portland cement concrete, with or without a bituminous mat less than 1 inch in compacted thickness.
Dual-type road	A graded and drained road, the wearing surface of which consists of two individual types, each of which has an aggregate width of at least 8 feet which may be in divided strips, both individual types being of such depth as to be classed logically as a part of the traffic-bearing road surface, rather than as surfaced shoulders.
Source: Arizona State Highway Department 1944a:ii	

TABLE 9
STATE HIGHWAY SYSTEM, 1939

Route	Description of Route	Miles
U.S. Highway 60 U.S. Highway 260	Holbrook-Springerville-New Mexico; junction U.S. Highway 70 near Globe-junction U.S. Highway 260 near Springerville; California-junction U.S. Highway 89 in Wickenburg; Alpine-New Mexico	357.0
U.S. Highway 66	Topock-Kingman-Flagstaff-Holbrook-New Mexico	385.2
U.S. Highway 70	Florence Junction-Globe-Safford-New Mexico	179.2
U.S. Highway 80	Yuma-Phoenix-Tucson-Benson-Bisbee-Douglas-New Mexico; Bisbee-Naco	500.3
U.S. Highway 89	Utah-junction U.S. Highway 66 near Flagstaff; Ash Fork-Phoenix; Tucson-Nogales	423.0
U.S. Highway 91	Utah-Nevada	17.0
State Route 61	junction U.S. Highway 60 at Ortega-junction U.S. Highway 260 at Concho; Witchwell-New Mexico	33.4
State Route 62 U.S. Highway 466	junction U.S. Highway 66 at Kingman-Boulder Dam (including Chloride spur)	75.6
State Route 64	Grand Canyon Park boundary-junction U.S. Highway 66 near Williams; Grand Canyon Park boundary-junction U.S. Highway 89 near Cameron	80.4
State Route 65	junction U.S. Highway 66 in Winslow-Coconino National Forest boundary	27.5
State Route 69	junction U.S. Highway 89 near Prescott-junction U.S. Highway 89 near Phoenix	97.9
State Route 71	Aguila-Congress Junction	25.7
State Route 72	Parker-Bouse-junction U.S. Highway 60 near Hope	49.5
State Route 73	San Carlos-McNary-Springerville (63.0 miles from junction U.S. Highway 70 near Cutter-Ft. Apache junction abandoned 1937)	128.5
State Route 75	Clifton-Duncan	30.4
State Route 77	Holbrook-Show Low-McNary junction; junction U.S. Highway 70 west of Cutter-Oracle Junction	150.4
State Route 79	junction U.S. Highway 89 northeast of Prescott-Jerome-Oak Creek Canyon- junction U.S. Highway 66 in Flagstaff	85.3
State Route 179	two miles north of Dewey on State Route 69-State Route 79 (Dewey cut-off)	8.5
State Route 81	Douglas-Safford; Solomonsville-Clifton-Springerville-Sanders; St. Johns-New Mexico	344.8
State Route 181	junction State Route 81-boundary Chiricahua National Monument	28.4
State Route 82	junction U.S. Highway 80 north of Tombstone-Nogales	68.2
State Route 83	junction U.S. Highway 80-Sonoita	27.8
State Route 84	junction U.S. Highway 80 near Gila Bend-Casa Grande-Tucson	121.6
State Route 85	Ajo-junction U.S. Highway 80 at Gila Bend	43.3
State Route 86	junction U.S. Highway 80 in Benson-junction State Route 81 in Cochise; Bowie Junction-New Mexico	64.2
State Route 87	Picacho-junction U.S. Highway 80 in Mesa	58.7
State Route 187	Sacaton-Casa Grande	14.4
State Route 287	junction U.S. Highway 80 at Florence-junction State Route 87 at Casa Grande Ruins National Monument	9.0
State Route 88	Apache Junction-Globe	78.6
State Route 92	junction U.S. Highway 80 near Lowell-east boundary Ft. Huachuca; junction State Route 82-north boundary Ft. Huachuca	42.7
State Route 95	San Luis-junction U.S. Highway 80 in Yuma-junction State Route 72 at Bouse	137.6

¹ U.S. Highway designation indicates roads in the "7 percent system" of the 1921 Federal Highway Act
Source: State Engineer 1939

The first of these road projects widened the “Cashion Highway” from two to four lanes (from 22 feet wide to 44 feet wide), beginning at 19th Avenue in Phoenix and heading west almost 15 miles to the Agua Fria Bridge. The second project improved State Highway 79 from Clarkdale up the hill into Jerome, a distance of 5.7 miles. Workers improved the curves, eliminated steep inclines, and built a masonry wall to act as guardrail on the first curve entering Hull’s Canyon. [In the project photographs, this masonry appears similar to the work on Highway 66 between Kingman and Gold Road, and if it remains intact today, it may be National Register-eligible.] The third project improved and realigned the road between Ray and Superior, widening it from 14 feet to 20 feet (CWA-FERA ca. 1935).

Although the majority of Depression-era road projects improved existing roads, some involved the construction of new roads. Two important examples of new roads built with Depression-era dollars are U.S. Highway 60 from Globe to Show Low through the Salt River Canyon, and the Bush Highway from the Salt River Valley to Jake’s Corner (Felton), where it joined Forest Highway 9 that ran from Roosevelt Dam to Payson and beyond (replacing the nineteenth-century Reno Road).

The 1916 Federal Aid Road Act included money to build roads in National Forests, but it was not until 1933 that funds were allocated through the Bureau of Indian Affairs to build roads on Indian reservations (FHWA 1977:247). The National Industrial Recovery Act of 1933, which allocated \$400 million for public highway construction, included \$50 million for roads through National Forests, National Parks, and Indian reservations (Collins 1999:144-145). By 1944, almost 9,800 miles of roads had been built on National Forests, National Parks, military reservations, and Indian reservations in Arizona. Only about 230 of these miles had been paved, and 520 miles were surfaced with gravel. Approximately 20 percent of the built roads were only graded and drained, and more than 70 percent remained unimproved (Table 10).

TABLE 10 ROAD MILEAGE IN ARIZONA, 1944					
	Type of Road				Total
	Unimproved	Graded and Drained¹	Gravel or Stone	Paved²	
State and Federal Aid Highways	163.4	475.5	279.8	2,906.2	3,824.9
County Rural Roads	10,000.1	2,699.9	1,654.4	1,085.9	15,440.3
National Forest Roads	1,913.8	1,300.0	163.5	0.0	3,377.3
National Park Roads	91.5	27.9	19.6	128.9	267.9
Indian Reservation Roads	4,954.2	663.0	332.6	57.5	6,007.3
Military Reservation Roads	45.7	39.5	3.4	44.9	133.5
City, State, and Alleys	219.8	242.1	197.1	386.1	1,045.1
State and City Park Roads	45.5	11.1	16.0	0.8	0.0
Totals	17,434.0	5,459.0	2,666.4	4,610.3	30,169.7
¹ includes soil-surfaced roads					
² includes bituminous surface treated, mixed bituminous, bituminous penetration, bituminous concrete, Portland cement concrete, and dual-type roads					
Source: Arizona State Highway Department 1944b					

War and Recovery

The number of vehicles with out-of-state license plates traveling through Arizona, both tourists and migrants, increased more than 40 percent from 1930 to 1938 (Housley 1996:62). Although the Depression did not decrease traffic in Arizona, the tire and gasoline rationing during World War II slowed the flow of traffic and “military transportation largely replaced tourism as the mainstay of traffic” (Housley 1996:86). Routine highway construction and maintenance activities also slowed during the war years, and the federal funds that came to Arizona more often came in the form of military investment in contrast to the

make-work projects of the 1930s. During the war years in the American West, “the federal government spent about \$40 billion on goods, military equipment, and a network of defense installations” (Housley 1996:87). Some of the military bases required construction of new roads, while existing bases required improved access roads. An example is the 6-mile-long State Route 92 connecting the Fort Huachuca Military Reservation with State Route 82, an upgrade completed by WPA in 1941 (*Arizona Highways* November 1941:47).

After the war, the end to rationing and an increase in prosperity brought Americans out on the highways in great numbers, and Arizonans followed the national trend. The post-war boom also increased the costs of road construction and maintenance, and the rising prices peaked and stabilized in approximately 1948 at about twice the pre-war cost (FHWA 1977:244). After limiting road construction dollars to roads strategic for the war effort in the Defense Highway Acts of 1941 and 1942, Congress returned to appropriating money to modernize and recondition the nation’s highways in 1943 and following years. Looking at the state’s highways in 1946, an engineer for the Public Roads Administrations gave a good report.

On the whole, a critical examination of the Arizona State highway system discloses a healthy condition. The Federal-aid highway system of about 2500 miles has had almost complete first- or second-stage improvement. It shows, as it should for the average traffic, a large percentage of construction with intermediate types of bituminous surfacing. In the future, particularly within the urban areas, more higher-type surfacing probably will be required. . . .The first obligation of the State is to maintain this system [and] most of the past construction will require revamping or reconstruction in 25 or 30 years. . . . future healthy highway development in Arizona seems assured (Hewes 1946:50-51).

In his 1946 report, the federal highway engineer did not foresee the huge increase in automobile traffic that was to occur within a decade. For instance, the number of automobiles traveling U. S. Highway 66 totaled more than 1 million by 1954, most with out-of-state license plates. The traffic on “The Main Street of America” became known as “The World’s Largest Traffic Jam” as the two-lane road clogged with traffic jams in most of the towns along its route (Housley 1996:102-103).

In addition to traffic jams, the increased traffic on Arizona’s two-lane highways contributed to three other consequences. First, the traffic exacerbated the wear and tear on the decade-old pavements. In the decade between 1944 and 1954, the Arizona State Highway Department spent \$19 million in maintaining and improving U.S. Highway 66 alone. According to the editor of the Flagstaff newspaper in 1945, U.S. Highway 66 “carries more out-of-state travel than any other highway in Arizona—and it is beyond question in the most miserable condition, narrow, rough, worn out and full of holes” (Housley 1996:104). Second, the traffic contributed to an increase in the number of highway accidents on the two-lane roads, raising public concern about highway safety and promoting interest in divided highways. Third, the increase in tourism fueled and was fueled by an increase in roadside businesses and a proliferation of garish signs along tourist routes, which eventually prompted the highway beautification movement in the 1960s (Figure 21) (Scott and Kelly 1988:178, 186).

POLICIES AND POLITICS: PEOPLE BEHIND ARIZONA’S ROAD SYSTEM, 1909-1955

National Register Criterion B states that a historic property may have significance if it is associated with the lives of persons significant in our past. The task of associating historically important people with



Figure 21. U.S. Highway 66 at Seligman, Arizona, 1955

twentieth-century road construction in Arizona is a difficult one because the first names that come to mind that fit the twin criteria of historic significance and association with road construction are nineteenth-century road pioneers such as Crook, Beale, Cooke, and Hamblin. Twentieth-century personalities associated with road building in Arizona are seldom widely known, as the sampling below will attest.

J.B. Girand, Territorial Engineer

Appointed in 1909 as the first, and only, Territorial Engineer, J.B. Girand personally directed road construction across the state during his three-year tenure. Girand's strategy to link county seats with Territorial Highways was the first Arizona-wide, systematic approach to road construction, and his two proposed routes remain important transportation corridors today, with some modifications. Modern U.S. Highway 80 is built along Girand's route from Yuma to Douglas through Phoenix and Tucson, and U.S. Highway 70 is built along Girand's route from Globe to Solomonsville. During his short tenure, 243 miles of wagon roads were upgraded to gravel highways. Girand initiated the use of prison labor on state highway projects, including the bridge across the Gila River at Florence and the Ash Avenue Bridge across the Salt River at Tempe, a practice that was continued into the 1930s.

George W.P. Hunt, Governor

The construction and maintenance of good roads has been a political issue for decades. Governor George Wiley Paul Hunt supported good roads in his first run for governor of the new state in 1911, and his name

is associated with the Hunt Highway, a road on the north side of the Gila River opposite Florence and running past Poston Butte. Governor Hunt's enthusiasm for roads and his long tenure as governor offered him the opportunity to influence road construction in Arizona. It may be more than coincidental that the Superior-Miami road was built through the canyons of Queen Creek during his tenure and the early years of federal aid. This road greatly facilitated transportation between the capital city and Globe, where Hunt had prospered in business after arriving as a poor teenager from Missouri in 1881.

Laurence I. Hewes, Bureau of Public Roads

At least one engineer in the Bureau of Public Roads had a substantial effect on road building in Arizona. In 1921, Laurence I. Hewes opened the new Western Headquarters of the Bureau of Public Roads and acted as engineer, comptroller, expeditor, and office manager for nearly 30 years until 1950. The office oversaw federal road building in 11 western states plus Alaska and Hawaii, including the connection of federal-aid roads to the roads of Mexico and Canada and the construction of National Forest and National Park roads. Hewes also recruited officials from the state highway departments of western states, the Forest Service, and the Park Service, as well as land management and public roads agencies to found the Western Association of State Highway Officials. "No one man contributed more to the development of the highways of the West than Dr. Laurence Ilesley Hewes. [His] superlative contributions in every phase of highway engineering gave great impetus to Western highway development" (FHWA 1977:490).

Charles C. Small, Civil Engineer

The creation of the Arizona state highway system can be credited to often nameless staff members, but two highway department employees stand out for their contributions. One was Charles Churchill (C.C.) Small, a civil engineer who had begun his career as a railroad location engineer in Massachusetts. At the time, there were few professionals trained in the new science of highway construction, and many highway engineers came from the railroads. He joined the State Engineer's Office in 1919 as chief location engineer.

When Small joined the department, the state boasted about 1,000 miles of highways, most in the two roads established as Territorial Highways in 1909. During the 13 years Small worked for the department, the state highway mileage doubled, and he oversaw several major construction projects including the building of the third state highway, which is the route that became U.S. Highway 66. Small also directed the modernization of the old Territorial Highway from Phoenix to Duncan (later U.S. Highway 70), and the route from Nogales to Flagstaff over Yarnell Hill (later designated U.S. Highway 89).

After Small had been named chief deputy state engineer, he initiated the construction of the final section of U.S. Highway 60 from Globe to Show Low, including the bridge over the daunting Salt River Canyon. A junior member of his staff remembered Small as "the guy who ran the place. State engineers came and went [but] he was the one who had the say." On a treacherous stretch of U.S. Highway 89 between Wickenburg and Prescott, a monument on the slopes of Yarnell Hill reads, "In memory of Charles Churchill Small, member, American Society of Civil Engineers, 1872-1932, Father of Arizona Highways" (Gray 1995a:3).

Fred M. Guirey, Landscape Architect

Another roadside memorial monument recalls the first landscape engineer in the Arizona State Highway Department. The plaque at the Oak Creek overlook honors the man who designed it, Fred. M. Guirey.

Trained as an architect, Guirey led the department in highway beautification efforts during the 1930s. Guirey took his first job with the department as a college student in 1930, helping to design the scenic route from Jacob Lake to the North Rim of the Grand Canyon. Guirey worked as a draftsman for the Arizona State Highway Department for two years, from 1933 to 1935, and then as the landscape engineer for the department from 1935 to 1942, he built carefully planned roadside viewpoints, often using native materials. He also argued in favor of using native plant species along highways, and contributed to the design of the innovative Miracle Mile on State Route 77 in Tucson.

After his years with the Arizona State Highway Department, Guirey worked as a consulting engineer in Phoenix. For more than 25 years, beginning in 1953, he served as an original member and chair of the Maricopa County Parks and Recreation Commission, tripling the acreage in county park system. But Guirey is most remembered for his pioneering work on roadside improvement, and the plaque on the viewpoint overlooking Oak Creek Canyon remembers Guirey as the “Father of our Roadside Rests” (*Arizona Highways* January 1994; *Arizona Republic* 5 November 1978:B-11).

R.C. (Cye) Perkins, State Engineer

Cye Perkins earned his “engineering spurs” working on railroads and at mines in Missouri before moving to the Arizona Territory in 1911 where he went to work for the Highway Department (*Arizona Republic* 18 May 1952, Part VI:2; 5 July 1954:1). He left to work in private companies, but returned in 1926 and worked for the department for the rest of his life, rising to the top position of State Engineer in 1951. He served in the position until his death in 1954. One of his earliest major projects was serving as chief engineer for construction of Maricopa County’s first paved road system, which involved a network of 327 miles of concrete highways. Another major assignment was building Gillespie dam and bridge. One of his most challenging jobs was building Navajo Bridge at Marble Canyon, 467 feet above the Colorado River. He also was in charge of construction of U.S. Highway 60 between Globe and Springerville, through the Salt River Canyon, and also helped plan and build improvements of the highway through rugged terrain west of Globe to Superior.

ROUGH TERRAIN: ROAD ENGINEERING AND CONSTRUCTION, 1909-1956

A property may be eligible for the National Register under Criterion C if it embodies the characteristics of a type, period, or method of construction. The design of a road, important construction techniques used in building it, or outstanding feats of engineering necessary to complete it may qualify the road as historically significant under this criterion.

The history of road engineering and construction in Arizona can be divided into two eras. The first, the era of the Territorial and State Engineers from 1909 to 1927, focused on the creation of connected highways. The second era began with the creation of the Arizona State Highway Department in 1927 and focused on the improvement of highways, both through the upgrading of pavement and safety standards, and through beautification projects.

Territorial and State Engineers, 1909-1927

As described above, the efficiency and popularity of the automobile in the first decades of this century forced the development of modern highway engineering, design, and construction techniques, both across the United States and within Arizona. In contrast to earlier forms of transportation, the automobile had the

capability to transport people and goods over distances of several hundred miles in hours rather than days; however, poor road conditions limited the automobile's capabilities. The existing rough roads and steep grades, as well as non-existent water crossings, made automobile travel difficult and slow.

Before 1909, county governments took responsibility for road improvements in Arizona. That year, the territorial legislature established the Territorial Road Fund to be supported by property taxes and expended by the new Territorial Engineer. Also in 1909, newly appointed Territorial Engineer J. B. Girand proposed a territorial highway system to connect Arizona's county seats with two highways intersecting in Phoenix. The proposed north-south highway was to connect the Grand Canyon to Douglas, and the proposed east-west highway was to connect Duncan to Yuma (refer to Figure 11). Reconnaissance and survey of the proposed system took advantage of existing pioneer trails and wagon roads to create approximately 1,000 miles of territorial highway. In 1911, the Territorial Engineer improved the first highway mileage by gravel-surfacing the Bisbee-Douglas segment of the Borderland Highway, a road project that applied road oil to stabilize the wearing surface for the first time in Arizona.⁶ By the time of statehood, Girand had been able to improve approximately 243 miles of his proposed 1,000-mile system, using standard techniques.

Arizona's first state highway engineer, Lamar Cobb, proposed a system of highways that incorporated the two Territorial highways and added a third highway across northern Arizona, a system adopted by the State Legislature in 1914 (Table 11; Appendix A, Figure A-1). Cobb defined this state highway system to connect Arizona's county seats with major towns and cities across the state. Some of these connections, such as Globe to Phoenix through Queen Creek Canyon and Prescott to Jerome over Mingus Mountain, would require exceptional roadway engineering and design to build roads through treacherous terrain.

As automobile reliability and travel speeds increased, the State Engineer's expanding staff undertook substantial roadway improvement projects, and the enhanced roadway designs and construction methods improved the quality of the state highway system (Table 12). Roadway design and construction of this era included the following:

- conducting surveys to locate roadway alignments and realignments
- improving road surfaces
- defining minimum roadway design standards, including roadway widths of 16 to 26 feet, and grades of no more than 6 percent (with a few exceptions dictated by terrain)
- bridging major rivers and streams
- building engineered drainage structures (culverts) with masonry using local site materials or concrete

Several road construction projects undertaken by the State Engineer in the 1920s required major engineering and design decisions. For example, the design of the new Superior-Globe highway through Queen Creek Canyon required construction of the first road tunnel in Arizona (refer to Figure 16). The new man-made Canyon and Apache lakes behind Mormon Flat and Horse Mesa dams required the realignment of the Apache Trail to higher ground in very rugged terrain. Moving the Yuma-Phoenix

⁶ Before the standardization of highway numbering in the mid-1920s, the Territorial and State Engineers sometimes referred to highway segments by their short, private highway names. The official title of this road was the "Yuma-Phoenix-Tucson-Douglas-Rodeo, NM Highway."

TABLE 11 STATE HIGHWAY SYSTEM, 1914		
Highway Name	Proposed Route*	Present Day Equivalent
Santa Fe Highway	Magdalena, NM to Topock, AZ	US 60 to Springerville, US 180 to Holbrook, US 180/I-40 to Flagstaff, I-40 to Seligman, SR 66 (US 66) to Kingman, I-40 to Topock
Borderland Highway	NM State Line to Yuma, AZ	SR 80 to Tombstone, SR 82 to Sonoita, SR 83 to I-10, I-10 to Tucson, SR 77 to Oracle Junction, SR 79 to Florence, Hunt Highway to SR 87, SR 87 to Mesa, US 60 to Phoenix, Old US 80 (I-10) to Buckeye, Antelope-Palomas Rd/Hyder Rd to Noah, I-8 to Yuma
North – South Trunk, Grand Canyon/Nogales Highway	Grand Canyon to Nogales	I-19 to Tucson, SR 77 to Oracle Junction, SR 79 to Florence, Hunt Highway to SR 87, SR 87 to Mesa, US 60 to Phoenix, US 60 to Wickenburg, SR 89 to Prescott, SR 69/169 to Camp Verde, I-17 to Flagstaff, US 180 to Grand Canyon
Roosevelt Dam Highway	Lordsburg, NM to Phoenix via Roosevelt	SR 75 to Clifton, US 191 to Solomonsville, US 70 to Globe, SR 88 to Apache Junction via Roosevelt, US 60 to Phoenix
Source: State Engineer 1914		

Highway from its original location on the north side of the Gila River to the south side required construction of an all-weather crossing of the river at Gillespie Dam.

By the end of 1926, the State Engineer's office completed the federally funded seven percent portion of the state highway system, and added secondary roads. The integrated system of roads served over 95 percent of Arizona's population (refer to Appendix A, Figures A-3.0 to A-3.18).

Arizona Highway Department, 1927-1956

In 1927, the Arizona Highway Department replaced the State Engineer's Office, and the new department aimed to improve the graded highways in the state to a fully paved system. That year,

TABLE 12 HIGHLIGHTS OF ROAD ENGINEERING DESIGN AND CONSTRUCTION, 1909-1956			
Date	Highway Segment¹	Current Highway	Design/Construction Events
1904	Mesa-Roosevelt Road (Apache Trail)	SR 88	Road construction through difficult terrain
1911	Bisbee-Douglas segment of Borderland Highway*	SR 80	Graded, surfaced with gravel; first reported use of road oil to stabilize road surface
1914-1915	Phoenix-Tempe Highway	US 60	First reported use of moisture control during grading to stabilize road surfacing material (caliche conglomerate and decomposed granite)
1915-1916	Phoenix-Tempe Highway and Grand Avenue section of Prescott-Phoenix Highway	US 60	First reported use of asphaltic oil to stabilize road surfacing
1915-1922	Topock to Holbrook	Old US 66 I-40	First reported use of volcanic cinders for surfacing; highway realigned to eliminate 20% grade at Ash Fork Hill; paved through Flagstaff; gravel surfaced Topock to Oatman, Seligman to Holbrook.
1917-1922	Bisbee Douglas segment	US 80	One of first two paved highway segments in Arizona
1917-1921	Geronimo-Solomonsville	US 70	One of first two paved highway segments in Arizona
1917-1922	Comet Peak (Florence Jct.) to New Mexico state line via Superior	US 60 US 70	Construction through difficult terrain; first road tunnel in Arizona (between Superior and Miami); extensive excavation in Queen Creek Canyon between Superior and Miami; highway paved between Miami and Globe
1925	Prescott-Phoenix Highway via Yarnell Hill	US 89	Newly designed highway segment shortens route to Phoenix by 27 miles
1920	Phoenix-Tempe Highway	US 60	First reported use of concrete paving
1920	Tempe-Mesa Highway	US 60	Highway segment reconstructed; first reported use of bitulithic surfacing on concrete
1921	Topock-New Mexico state line, via Flagstaff	Old US 66 I-40	First segment of highway paved through Flagstaff with asphaltic concrete and bitulithic overlay
1924	--	--	State Highway Department initiated road striping to improve safety
1916-1924	Phoenix-Yuma Highway	I-8 Old US 80 SR 85	Major realignment from Yuma to Gila Bend; new crossing of Gila River at Gillespie Dam; paved from Buckeye to Phoenix
1916-1926	Clifton-Springerville Highway	US 180 US 191	First Forest Service highway constructed in Arizona
1932	Oak Creek Canyon Highway	US 89a	Construction through difficult terrain; required massive excavation and fills to reach the top of canyon
1933-1934	Phoenix-Prescott highway	US 89	Major realignment up Yarnell Hill
1934	Topock-Flagstaff and Flagstaff-Gallup Highway	Old US 66 I-40	First use of highway landscaping and beautification by the State Highway Department
1935	Black Canyon Highway	SR 69	Major realignment of county road for more direct route between Phoenix and Prescott; improved and graveled
1931-1936	Globe-Show Low Highway via Salt River Canyon	US 60	Construction through difficult terrain with modern heavy construction equipment and techniques (bulldozers, portable drills, blasting, massive cuts and fills)
1937	State Highway System (primary)	--	All primary state highways now surfaced with pavement or oil
1938	Topock-Flagstaff and Flagstaff-Gallup Highway	Old US 66 I-40	First completely paved national highway and first paved highway in Arizona

TABLE 12 HIGHLIGHTS OF ROAD ENGINEERING DESIGN AND CONSTRUCTION, 1909-1956			
Date	Highway Segment¹	Current Highway	Design/Construction Events
1941	Tucson-Florence Highway “Miracle Mile” segment	US 80	First divided highway interchange in Arizona with landscaped medians constructed in Tucson
1934-1949	Tucson-Mt. Lemmon Highway	Catalina Highway	Road construction through difficult terrain; first graded in 1934; paving completed 1949
1950	Queen Creek and Pinto Creek bridges	US 60	Bridges reflect ADOT’s capabilities for designing and aesthetically pleasing and functional structures
mid 1950s	State Highway System (primary)	All	By 1956, all of the primary State Highway System hard-surfaced with asphaltic concrete or concrete pavement
¹ This table incorporates language used in the reports of the Territorial Engineer and the State Engineer. Before the mid-1920s when numbers were first used to designate highways, highway officials sometimes used names in common usage to designate Arizona highways.			

just over 200 miles of Arizona highways had been upgraded to either asphalt or concrete paving, while almost 900 miles were surfaced only with gravel. Another 900 miles of the state’s highways were only graded or remained unimproved. Less than a decade later, in 1938, over 2,000 miles of Arizona’s state highways had been surfaced with asphalt or concrete. By the beginning of World War II in 1941, the entire federally funded portion of the state highway system had been paved, and the state had begun the task of paving secondary state highways. Although major highway construction slowed due to manpower and material shortages during the war years, the state highway department realized the goal of a completely paved state highway system by the mid-1950s (refer to maps included in Appendix A, Figures A-4.0 to A-7.0).

Along with the task of upgrading the surfaces of existing roads, the State Highway Department continued to construct new alignments, sometimes across very difficult terrain. Some of the new roads overcame natural barriers that had prohibited road construction in the past, and required sophisticated engineering. For example, the 1930s alignment of U.S. Highway 60 from Globe to Show Low crossed the formidable Salt River Canyon and climbed the Mogollon Rim. State Highway 79 (later U.S. 89A) bridged Oak Creek in three places and conquered the sheer north face of Oak Creek Canyon. Other new alignments were designed to provide faster, more direct routes. For example, the Phoenix-Prescott road through the difficult terrain of the Black Canyon of central Arizona provided a more direct route between the two cities, but required more modern engineering than the earlier road through Phoenix and up Yarnell Hill. Although the route was first surveyed in 1920, the Black Canyon Road was not paved until the 1950s.

Upgrading road design included more than simply improving the road’s surfaces, and by the 1930s, state highway department engineers concerned themselves with widening roads, flattening curves, and adding super-elevation for safety. Also for safety, they added a centerline stripe and guard rails. But up until the mid-1930s, highway engineers

gave little or no thought to the immediate roadside. We continued using borrow pits, narrow rights of way, [and] permitted the erection of structures so close to the highway that they were an actual menace. We paid little or no attention to the aesthetic value of the roadside. We allowed pole line workers to butcher trees of any and all description at will. We still blasted with reckless abandon through hill and country sides, even in cases where it might have been avoided, and left unsightly, permanent scars of construction in our wake (*Arizona Highways* April 1935:11).

Following the 1934 Bureau of Public Roads directive that every state receiving federal aid should employ a landscape architect or engineer, the State Highway Department employed Fred M. Guirey to take on the task of beautifying the state's highways. Mr. Guirey maintained that the proper terminology should be "roadside improvement" because his projects encompassed improvements to safety, soil conservation, erosion control, and simplification of maintenance, in addition to beautification. Projects focused on:

- rounding cuts
- adding wide shoulders
- filling open borrow pits, and re-seeding them when necessary
- flattening fill slopes, cut slopes and back slopes as much as possible
- building culverts big enough to handle flood waters and prevent gouging and scouring
- saving existing landscaping when possible, and adding trees, shrubs, and cactus
- building roadside parks, rest areas, and viewpoints at scenic vistas

Mr. Guirey described his goal in 1935: "Our ultimate aim is to fuse the road proper into the surrounding terrain in such a way that it will no longer have the appearance of a structure forced through an unwilling natural setting." He also looked to the future when he mentioned his "hopes that some day that Great American institution, the bill board, will disappear" (*Arizona Highways* April 1935:11, 21). The advent of World War II precipitated the dissolution of the landscape division, and Guirey left the highway department in 1942.

The innovative work of the Arizona State Highway Department from 1927 to 1956 produced roads that have endured with few changes to the present. The department transformed the dusty parallel ruts of Territorial roads and highways to modern roads.

WHAT'S LEFT?: THE ARCHAEOLOGY OF ARIZONA ROADS

A property may be eligible for the National Register under Criterion D if it has yielded, or is likely to yield, information important in prehistory or history. Schlereth (1997) has promoted an approach to "reading" the history of roads through what he calls "above-ground archaeology." This strategy involves consideration of the typology of roads, bridges, and cross-drainage structures, signs, place names, and roadside artifacts and architecture, with an occasional peek beneath the surface in "mini-archaeological excavations" (potholes), or more standard archaeological excavations.

Historic records, plans, and maps provide substantial documentation about the characteristics of some roads. Archaeological recording can be used to verify and supplement such records by providing information about characteristics of roadways and associated features (such as bridges, culverts, and retaining walls), regardless of whether the road is abandoned and in ruins or still in use. The potential for archaeological investigation of roadside architecture has been previously recognized in an earlier historic context (Rodda 1992). The archaeological record of road building in Arizona also includes remnants of temporary camps built to house construction workers. In the 1920s, both contractors and state-supervised teams of convicts lived at these camps. Later, the state highway department built road maintenance facilities at strategic points along the highway.

For an Arizona road to achieve significance under Criterion D, study of the road itself, or artifacts and features associated with the period of significance must have potential to yield important information not available in historic records.